

REMARKS

Claims 1-26 are currently pending in this application. Claims 1 and 14 have been amended to clarify that the step of lining at least the trenches adjacent to the at least one mesa occurs after the doping of the sidewall surfaces and prior to the filling of the trenches. Support for these amendments may be found, for example, at least in the original Specification at page 10, line 16 through page 11, line 11. Accordingly, no new matter has been added.

Entry of Amendment After Final

Applicant respectfully submits that (1) no new matter has been added to the application by the Amendment; (2) the Amendment resolves all issues raised by the Examiner in the Office Action mailed December 29, 2009; (3) the subject matter of the Amendment has been included in the Examiner's search and therefore does not require the Examiner to perform further searching; and (4) the Amendment places the application in condition for allowance and in better form for an appeal if needed. Consequently, Applicant respectfully request that the Amendment After Final Rejection be entered in accordance with 37 C.F.R. § 1.116 and MPEP § 714.13.

Claim Rejections Under 35 U.S.C. § 102(e)

Claims 1-26 were rejected by the Examiner under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. 2006/0205174 (Hshieh). Applicant respectfully requests that the rejection of claims 1-26 be withdrawn for at least the following reasons.

Claims 1 and 14 are directed to a method of manufacturing a semiconductor device and recite, *inter alia* as follows (emphasis added):

after the doping of the first and second sidewall surfaces of the at least one mesa is completed, lining at least the trenches adjacent to the at least one mesa with an oxide material; and

after the lining with the oxide material is completed, filling at least the trenches adjacent to the at least one mesa with one of a semi-insulating material and an insulating material.

Hshieh fails to disclose lining the trenches adjacent to the mesa with an oxide material after doping of the sidewalls and prior to filling the trenches. Applicant previously presented this argument in the response dated October 28, 2009, but the Examiner stated that this was not a claimed limitation. While Applicant respectfully disagrees, claims 1 and 14 have been amended, solely for purposes of advancing the prosecution, to affirmatively recite that the lining of the trenches occurs after doping of the sidewalls and prior to filling the trenches.

Hshieh discloses a method of manufacturing a P-type semiconductor device. For example, a P-epitaxial layer is etched to form mesas separated by trenches at step 101. At step 103, the mesas and trenches are covered with a thin oxide layer. (Paragraphs [0078]-[0081]). This thin oxide layer can be seen in, for example, Fig. 3, designated by reference number 6, or Fig. 27 designated by reference number 1506. In a subsequent step 104, a first implant is made to implant P dopant to one side of the mesas. In step 105, a second dopant implant is made to the opposing sides of the mesas. (Paragraph [0081]). Thus, deposition of a thin oxide layer on the mesas takes place before the doping of the sides of the mesas.

In contrast to Hshieh, claims 1 and 14 call for an oxide material to be deposited over the trenches adjacent the mesas after the doping of the trench sidewalls has been completed. This step provides a benefit of reducing charges on the surface of the silicon in the trenches because the oxide will “consume” the charges, thus leading to a more reliable semiconductor device. (See e.g., page 10, lines 20-28 of the present application). For a reference to anticipate a claim, the reference must include, either explicitly or inherently, all of the elements of the claim arranged as in the claim. M.P.E.P. § 2131. Hshieh fails to disclose all of the steps of claims 1 and 14 in the order provided, namely, that the deposition of oxide material over the trenches occurs prior to doping of the trench sidewalls. Hsieh therefore cannot anticipate claims 1 or 14. Accordingly, Applicant respectfully requests that the rejection of claims 1 and 14 be withdrawn.

Claims 2-13 are dependent on claim 1. Claims 15-26 are dependent upon claim 14. Applicant respectfully requests that the rejection of claims 2-13 and 15-26 be withdrawn, due at least to their dependence on claims 1 and 14, respectively.

CONCLUSION

In view of the foregoing Amendment and remarks, Applicant respectfully submits that the present application, including claims 1-26, is in condition for allowance and such action is respectfully requested.

Dated: March 26, 2010

Respectfully submitted,

By 

John D. Simmons

Registration No.: 52,225

PANITCH SCHWARZE BELISARIO & NADEL LLP

One Commerce Square

2005 Market Street, Suite 2200

Philadelphia, Pennsylvania 19103

(215) 965-1268

(215) 965-1331 (Fax)

jsimmons@panitchlaw.com (E-Mail)

JDS/SEM
205437